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NOTES ON NEW OR RARE SPECIES OF *RAVENELIA*.

W. H. LONG.

In the study of the genus *Ravenelia* the following characters have been found of much importance. Some of them are often omitted from descriptions, hence attention is called to them: 1. The position of the sori, whether sub-epidermal or sub-cuticular. 2. The number and position of the germ pores of the uredospores. 3. The position and number of the cysts. These are all constant characters for any given species and can surely be determined from the usual herbarium material, as drying does not destroy them. The first must be determined by sectioning the host; the germ pores by boiling in a solution of 50 per cent. lactic acid, and the cyst characters by glycerine and lactic acid mounts.

Uredospores of the globose or sub-globose type have germ pores many and scattered, while those that are distinctly longer than broad have few (4-8) germ pores in one or two definite rows.

The position, shape and number of the cysts are of vital importance and should be carefully noted.

A good means of studying this character is to mount the specimen in a mixture of equal parts of 95 per cent. alcohol and 100 per cent. glycerine. In this the cysts will swell very slowly, thus giving time for observation. Often a drop of 50 per cent. lactic acid will have to be added to produce the desired result, *viz.*, a slow swelling of the cysts, thus revealing their shape and position; or even boiling may have to be resorted to in order to clear up the heads and swell the cysts ready for high power study.

Cysts that are *appressed* to the under surface of the head will

not show in the *first* mount of glycerine and alcohol, while cysts that are pendent can easily be seen; pendent cysts are beneath the entire head, while appressed or pulvinate cysts are peripheral; a third type of cysts is seen in those heads with *many* spheroid cysts beneath the surface, but *not* pendent. *Ravenelia microcystis* is an example of this class. Many of the appressed type of cysts will appear as if pendent when mounted in water or in a lactic acid solution, for they then swell up and hang down around the stipe like truly pendent cysts.

Two new species are here described, one from Florida and the other from Jamaica. Also emendations and remarks on several Mexican and Texan species heretofore described.

***Ravenelia piscidia* Long n. sp.**—Sori sub-epidermal, II sori mainly hypophyllous, III sori usually epiphyllous. II sori small, punctiform, on pallid spots that show markedly on the upper surface of the leaves; II sori cinnamon brown, scattered or in irregular groups. II spores sub-globose, somewhat angular, strongly and closely verrucose, germ pores scattered, about 8, fulvous, walls unifom, $17-20 \times 20-23 \mu$, usual size, $20 \times 20 \mu$. Paraphyses sparingly present, hyphoid to sub-clavate, often curved like a golf club, fulvous, $10 \times 30-35 \mu$, bases semi-hyaline and collapsed. III sori on different leaves, epiphyllous, small, orbicular, black-brown, firm, well scattered over entire surface of leaf. III heads chestnut brown, smooth pulvinate, $65-80 \mu$, 4-5 spores in cross section, many heads only ten-spored, 6 peripheral and 4 central ones; paraphyses sparingly present in III sori, cysts hyaline, flat, appressed, peripheral, coherent into stipe, swelling and bursting in water; pedicel short, deciduous, hyaline.

On *Piscidia erythrina*, Miami, Fla., March 25, 1903. Coll. E. W. D. Holway.

This species is close to *R. uleana*, but differs in its pedicel being short and its cysts being flat and in all its gross characters.

***Ravenelia arthuri* Long n. sp.**—Sori sub-epidermal, epiphyllous; II sori not present. II spores intermixed with III spores. II spores fulvous, walls thick, uniform, spinulose, oval to globose, germ pores scattered, more than 6, $20 \times 20-26 \mu$, paraphyses not present. III sori linear to elliptical, small, surrounded by the very prominent ruptured epidermis, black brown. III heads pulvinate, chestnut brown, smooth, $75-100 \times 40-45 \mu$ thick, 4-8 spores across, heads often irregular, cysts very many, pendent, beneath entire head, globose, hyaline, with a brown, finger-like projection from base into center of cyst, swelling and finally bursting in water; pedicel short, compound, hyaline, deciduous, cysts often separating from heads.

On unknown plant, Jamaica, W. I., Feb., 1891. Coll. Thaxter from Herbarium of Dr. Farlow.

This species differs from *R. uleana* in all its gross characters and in its short deciduous pedicel.

Ravenelia australis. Sori sub-epidermal, epiphyllous; II sori not present; II spores intermixed with III spores; II spores faintly echinulate to smooth, walls uniform, elliptic to slightly fusiform, fulvous, germ pores four, equatorial, large, 10-16 x 27-32 μ , paraphyses sparingly present, clavate to sub-capitate, fulvous, darker at apex, 30-40 μ long, heads 10-15 μ thick, base of stipe hyaline. III sori scattered, epiphyllous, black brown, orbicular, small, naked or rarely surrounded by the ruptured epidermis, from 3 to many heads in a sorus. III heads chestnut brown to black brown, smooth pulvinate, 6-8 cells across, 70-100 μ , cysts appressed coherent, peripheral, hyaline; pedicel compound, hyaline, short, deciduous, cysts bursting very easily in water.

On *Leucaena microphylla* Igualla Mex., Nov. 2, 1903, No. 5314 of E. W. D. Holway.

This species was reported by Dr. J. C. Arthur as *R. verrucosa* in his "Leguminous Rusts from Mexico," Bot. Gazette 39:392, June, 1905. There are two points of difference in this and in the description of *R. australis* as originally published, viz., the cysts are reported as *many* and pedicel not compound. If this is correct then the Mexican plant here described is not *R. australis* but is a new species. The other characters coincide so fully that the writer has placed it as *R. australis* in spite of the differences noted.

Ravenelia mexicana Transz. was collected by Pringle, Sept. 12, 1889, in Mexico on *Calliandra grandiflora*, and has not since been reported, notwithstanding the many collections of Mexican species by Mr. Holway; that the plant was not rediscovered seemed strange, so a careful study of the Mexican species was made, with the result that the writer is fully convinced that *R. mexicana* Transcz. and *R. mimosae-sensitivae* P. Henn. are the same species. A careful comparison of the *types* of the two species, with subsequent collection of one of them, was made, and the above opinion confirmed. The II heads of both plants have one very marked character, viz., the papillae on the heads are longer and more prominent around and near the base of the head than those at the top, being often reduced at top to warts. This is an unusual character and determined the identity of the two plants. No II spores of *R. mexicana* were seen, but the described shape and size agrees with those given for *R. mimosae-sensitivae*; also the recently described species, *R. inconspicua* Arthur, is the same plant as *R. mimosae-sensitivae*, with slightly smaller uredospores

(3-4 μ difference). As the writer sees it, *R. mexicana*, *R. mimosae-sensitivae* and *R. inconspicua* are all one and the same plant.

There are four other species so closely related that they should be considered as one species, viz., *R. expansa*, Diet. & Holw., *R. fragrans* Long, *R. humphreyana* P. Henn., and *R. pulcherrima* Arthur, while the last two are undoubtedly identical, even to the peculiar colored paraphyses.

R. expansa and *R. fragrans* differ mainly in the shape of their paraphyses, but the writer has found varying shades of these on the different hosts in Holway's collection; the other characters of the two are practically identical; the papillae on some heads of *R. fragrans* are more pronounced than on *R. expansa*, while on others they are of the same size; *R. humphreyana* differs from both in the intense wine-colored heads of its paraphyses, but the shape is the same as *R. expansa*; this color is probably due to the host; the III heads of *R. humphreyana* have slightly less prominent papillae or warts; if the paraphyses are disregarded, then the four species are the same. No. 5359 of E. W. D. Holway is *R. indica* and not *R. cassiaeicola*; Nos. 5324, 5328, 5326, 5263 are *R. expansa* all of Holway's collection, "Leguminous Rusts from Mexico," Bot. Gazette 39:392, June, 1905.

Denton, Texas.

A NEW ENTOLOMA FROM CENTRAL OHIO.

BY GEORGE F. ATKINSON.

Specimens, notes and photograph of a fungus that proves to be new were received from Prof. W. A. Kellerman. The following diagnosis is given:

Entoloma subcostatum Atkinson n. sp.

21542.

Photogr. Coll.

On grassy ground, Campus, Ohio State University, Columbus, Ohio. Coll., R. A. Young, Com. W. A. Kellerman. No. 4930. Received Nov. 1, 1906.

Plants gregarious or in troops or clusters, 6-8 cm high; pileus 4-8 cm. broad; stems 1-1.5 cm. thick.

Pileus dark gray to hair brown or olive brown, often subvirgate with darker lines; gills light salmon color, becoming dull;